

Lightweight Deployable Power Generator

A Collaborative Effort between the US Air Force Research Laboratory and Private Industry

THE PROBLEM:

Current Bare Base generators are large, heavy and built based on 1960s technology. They account for more than five percent of the initial and follow-on deployment sorties. Rapid deployment of Air Force resources demands the development of compact, lightweight equipment.



Current Bare Base Generators

THE SOLUTION:

The Air Force Research Laboratory, Materials and Manufacturing Directorate, Airbase and Environmental Technology Branch (AFRL/MLQC), is developing a lightweight generator. This unit possesses reduced weight and volume, improved reliability, enhanced fuel economy, and reduced logistics and operation and maintenance costs.

The lightweight generator design concept is based on a high-speed rotary engine as a prime mover, perma-

nent magnet disk generator for power generation, and state-of-the-art electronic switching devices for power conditioning.

Rotary engine technology was selected because of its compact size, lightweight, and high performance. Rotary engines with multi-fuel capability are available (JP-4, JP-5, JP-8, diesel, gasoline, and kerosene).

The disk generator is very compact and lightweight. When combined with its rectifier and inverter, the disk generator is capable of producing electric power of 50/60/400 Hz frequency without loss of output power.

The control architecture is designed to respond to transient loads without decreases in-line voltage or frequency, and to reduce fuel consumption and engine wear through variable speed operation.



Rotary Engine



The weight of the generator set is approximately 40 percent less than conventional generator sets. A 120KW set was built and recently tested by AFRL/MLQC at Tyndall Air Force Base, Florida. The initial test results were extremely favorable. This technology has the potential to revolutionize Air Force power generation systems.

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120KW Genset

Generator Architecture

